An Inaugural Dissertation
on
Animal Life.

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of

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On Animal Life.—

The following pages contain some remarks on Animal Life. I have ventured on this subject, not from mere opposition to the generally received sentiment concerning it. Veneration, & affection equally incline me to the contrary. But systems challenge investigation; and the good sense of their projectors reconciles them even to the severity of criticism. This last task is not the duty of a young man. Mine shall be only to express the difficulties which present themselves to me, even when endeavouring to coincide with those, whom, study & talents

on the one hand have failed to decide, and whose decisions are, I had almost said, counteracted by time on the other. — —

Life has been considered an Effect. That it is one, no rational being can deny. Creation in its utmost extent is an effect. God spake and there was light, & life.

But animal life, that which presents us with such wonderful phenomena, on which man depends as a condition for making known to his fellow-men the intricate windings of abstract speculation; on the possession of which alone he is enabled to investigate the secrets of nature; on which in short the finial cause of his existence entirely depends is considered the Effect of secondary

causes. I respect, I venerate the authors of the systems, and anticipate their pardon for my presumption for withholding my assent to it. — —

An Effect ceteris paribus, must always result from the existence of a cause which ever has been attended with a similar effect. — Barbarus has taught and perhaps with much propriety, that a cause to be such, exists or is necessarily attended with its effect, that they are simultaneous, & the two words cause and effect result from that weakness of our understanding which can view ideas & occurrences only in succession. That it is not what will be, but what really is, followed by a particular result, that is

cause. Now one of the causes or stimuli of life is air. A question now naturally presents itself. If life has ever been the result of this stimulus, why are we not able by the same means to reanimate a lifeless body? Why do we not breathe and bid the phenomena of life appear?—

It is answered that a capacity is absolutely necessary for the effects of the stimulus to appear which uniformly have appeared when that capacity existed it, the stimulus being presented. What are we to understand by this capacity? On the new theory it can only mean a certain condition of some parts of the system calculated to be acted on, by certain stimuli,

in the action of which certain effects shall be produced in those parts which shall become causes, & inductive of other effects, viz, the wonderful phenomena resulting from the operations of the Animal economy,

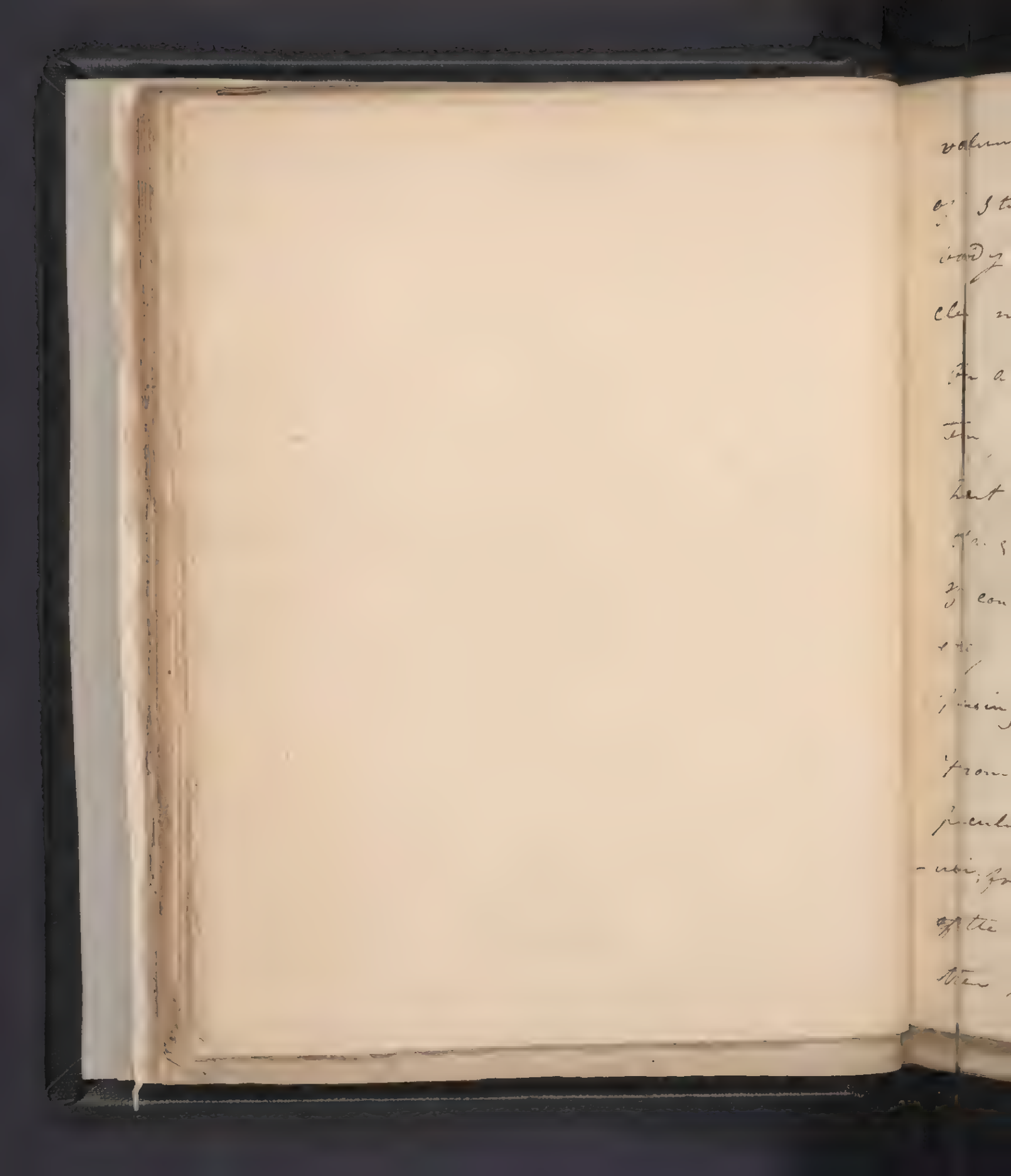
But in this the case if the hypothesis be correct, does not the failure of experiments instituted for the recovery of those suffocating under asphyxia for instance, (leading us to) the assertion that air is the cause or stimulus of life & further that in order that air should become a stimulus of life, it must enter the lungs. The lungs must have been originally prepared for its reception, & if they were or became, by a Law imposed on air, it

must have necessarily entered them, and the phenomena of life must have followed. Had the human lungs been constructed as they have supposed, there could have been no natural necessity for the exercise of the Divine interposition of the Deity in the production of the Life of man — Life and its wonderful effects were all the attributes of the vast range of the brute creation, long before the creation of man, and the subjects of it were prepared [illegible] to receive themselves before this last great work of the Deity. — Could contractility, irritability, sensibility, the circulation of the blood, which is consolidated by rest, could animal heat, finally

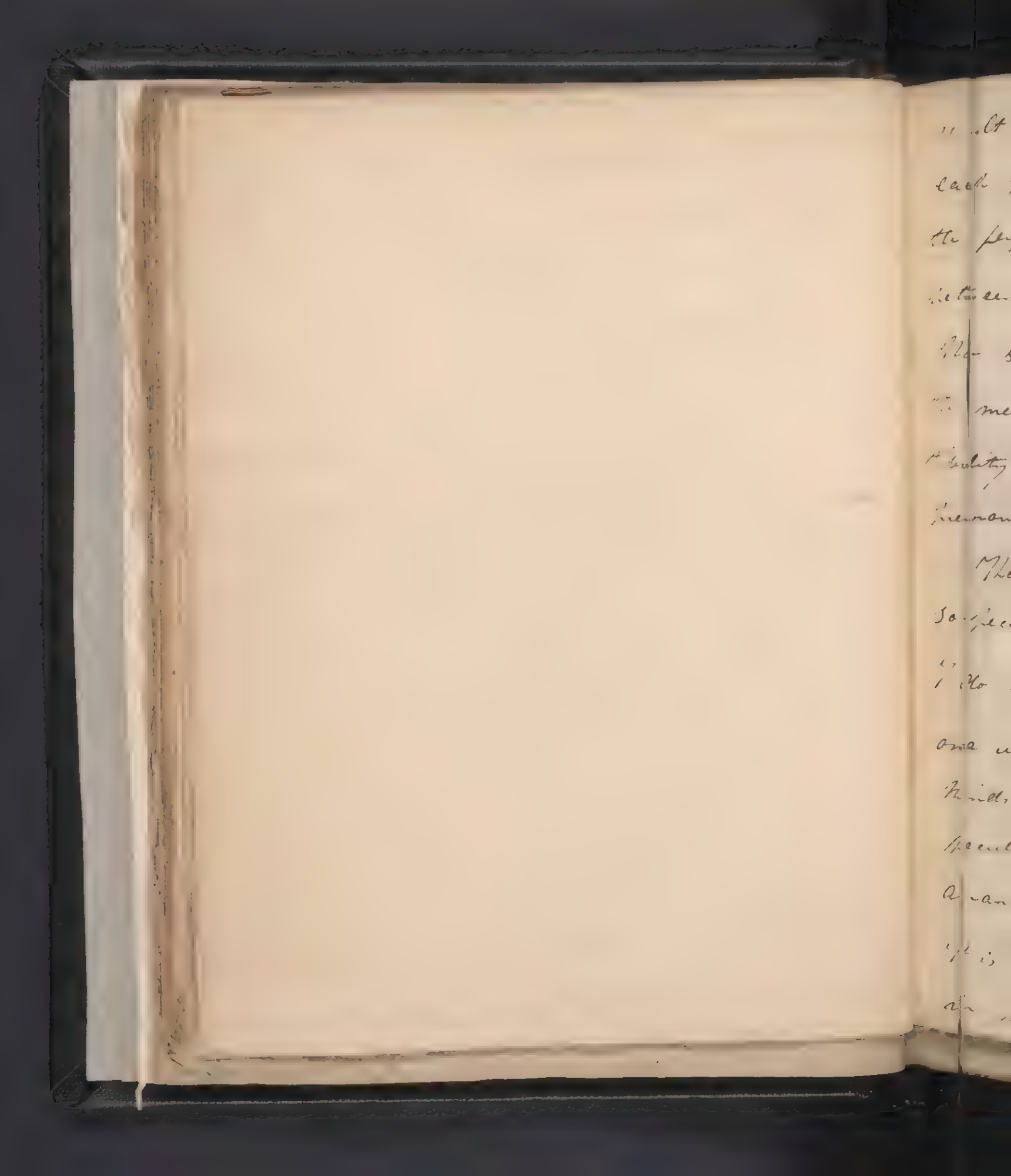
be the accidental results of one lifeless, inert
[illegible] ! we are told that God breathed
into Man. If this merely means the entrance
[illegible] into the Lungs, what according
ing to the nature of things would have been
the result? The Lungs which before were
either a partial natural vacuum, or naturally
compressed not possessing any faculty,
from other matter, must necessarily have
been left in the same situation with matter
in general. The equilibrium being restored,
nothing further could take place, But
this is not the case, By the expansion
of the air vessels of the Lungs, the blood
vessels become permeable. the blood leaves (by
diffusion / the [illegible] /) enters the expanded

lungs, enters the heart, and thence commences its wonderful circulation, dispensing life, heat, and vigor through the most minute portions of the system. —

But is there not something more, necessary — than the mere entrance of the air into the Lungs, that the phenomena of respiration may take place? Undoubtedly there is. Muscular motion is a phenomenon as striking as respiration; in fact respiration depends on it's result; & it must be excited; which can only be effected by the peculiar properties of the muscular fibre. From whence is this peculiarity of muscles derived? Muscles, for the purpose of



voluntary motion, are under the influence of stimuli even when separated from the body. But what does the motions of muscles not dependant on the will depend? On a connection with a part of the system essentially different from any other part as to structure, insensible [redacted] being the seat of sensibility, destitute of contractility, than is the source of this connection with other function of the body. This susceptible connecting portion of the system is the Brain. From whence did the Brain derive such peculiar properties? Surely, not from stimuli; for before the system can be susceptible of the action or impression of stimuli, before their necessary, appropriate effect can



result a brain is necessary. The connection of each part of the body, which is destined to the performance of any function, must exist between such part and the Brain.—

No stimulus can act on the brain through the medium of other parts, unless their susceptibility to such action, or power of action, has previously been derived from the Brain.—

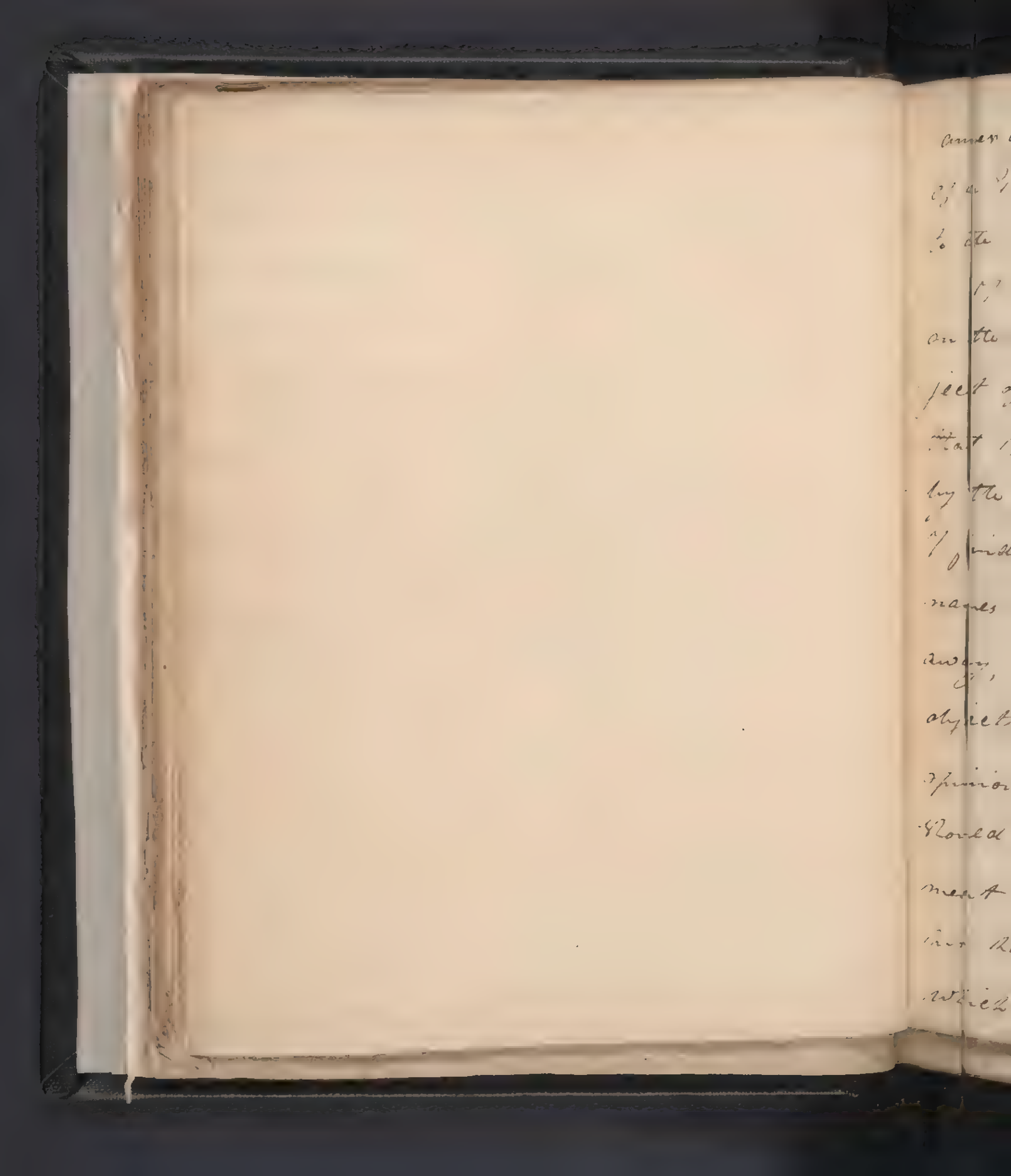
What the power or property viz life so essential to animal is intelligent I do not even imagine. But that it is one which distinguishes it from all other kinds of matter or existence whatever, whose peculiarities are the results of accidental or mechanical arrangement, I do not hesitate to believe. It is a power or principle, that like all others in nature it acts necessarily.——

"... in its perfection it appears to be a
power by the energy of which various species of matter
are connected to one kind in the one [illegible]
system, so that the matter thus connected has
the power of resisting the operation of external
causes by preserving itself from decomposi-
tion and decay". And this essentially dis-
tinguishes it from common matter. It is a power
constantly operating within for the nourishment
& preservation of the subject in which it resides;
it is a quality which renders the subject
of it specifically different from all known
matter. The reason that life is an ef-
fect is, according to the definition, that
some cause given it viz that it is an
aggregate of all the actions & motions of
the animal economy, which renders

from the impression of stimuli on an aptitude in the system to be acted on, called also excitability. This being assumed life is said to be a forced state. Now, as long as an aptitude of this kind remains the phenomena of life must appear; whenever causes are applied calculated to produce such effects. But we find this not to be the case, innumerable instances of suspended animation where the process of decomposition could not have taken place, are on record [illegible] in which the benevolence of humanity has prompted to the noblest exertions to ~~a~~ restore the animal functions without success. Further, on the new theory, the aptitude for life is in a di

direct ratio to the abstraction of stimuli; but universal experience testifies that resuscitation is difficult in proportion to the ~~period~~ length of the time of suspended animation, so that the cause of increased aptitude for life is the most certain instrument of its destruction. —

This aptitude must, I conceive, be the result of of some peculiarity of ~~arrange~~ ~~ment~~ matter as it respects its arrangement, & it has been asserted to be such. The affinity of matter with matter, has been considered the cause, the sole cause of the adaptation of animal matter for the action of stimuli or causes producing life. From this doctrine, theories have



ciser as will as those which the imagination of a Paracelsus framed; and perhaps as pleasing to the Deity. I pass them by in silence.—

I hope I shall be permitted to dwell on the doctrine. When I enter on the subject of the Oxygenous Philosophy, I feel that I am entering on one consecrated by the best talents of the greatest men. I find enrolled in its defence not only names the subjects of which have moulded away, but likewise of those, who live the objects of my respect and regard. Their opinions are founded on a science which should be, I is, among the noblest employment of the Physician. It has placed in his hands [illegible], yes weapons by which he frustrates disease at his feet.

I anticipate pardon, if warmth should exceed ability; I hope for it if respect for opinion should give place to the investigation of system. — Granting that juxta-position, the effect of affinity, is the circumstance which distinguishes animal matter from all other matter. This affinity must be under the influence of certain Laws — or rather within a certain sphere only can it act; [&] only on certain objects — I cannot conceive [illegible] [illegible] exciting principle. [illegible] account for the results which take place from animal processes. [illegible] allows for the powers of preservation which animal matter passes? Is it by this that man becomes the inhabitant of every climate, or is it believed that it adapts itself ~~not~~ to circumstances though it be admitted to be under

the influences of Laws! — By the progression of animal life matter the most heterogeneous are converted into one possessing exactly the same sensible qualities, & exhibiting the same by chemical analysis. — One and the same Law, limited & unchangeable, under circumstances the most opposite is assisted to be the cause of uniformly the same effects: —

The affinity of oxygen with the animal fibre is assumed as the cause of that irritability, by which the different parts of the structure are enabled to perform their several functions. — But how on this doctrine can we account for the peculiarities of the fœtal state of animal existence? — This presents us with growth, this is the effect of nourishment. Nourishment is the effect of assimilating powers, — life & structure.

intricate almost beyond explication. Possessing with all the preservative power as perfect as the adult. We will consider the foetus as perfect in its parts. Now, from whence does the little animal derive its power of irritability, contractility, and its actual motion? It is answered, from the affinity between oxygen and the animal fibre, there from which results a combination ~~of~~ exactly ~~the~~ such peculiar effects, as are to follow.

But through what medium is the combination effected? how are the vessels, attracting objects brought within the sphere of their respective attraction, or affinities, through the medium of circulating blood? Blood deriving its oxygen from the atmosphere, that being taken into the lungs by

the mother, and then conveyed to the foetus by a direct connection of the foetus with the mother?

No. a direct communication has never been demonstrated. Injections pass readily & directly from the umbilical arteries to the umbilical vein. No vessel constituting a connection between the mother & foetus, has be demonstrated. * —

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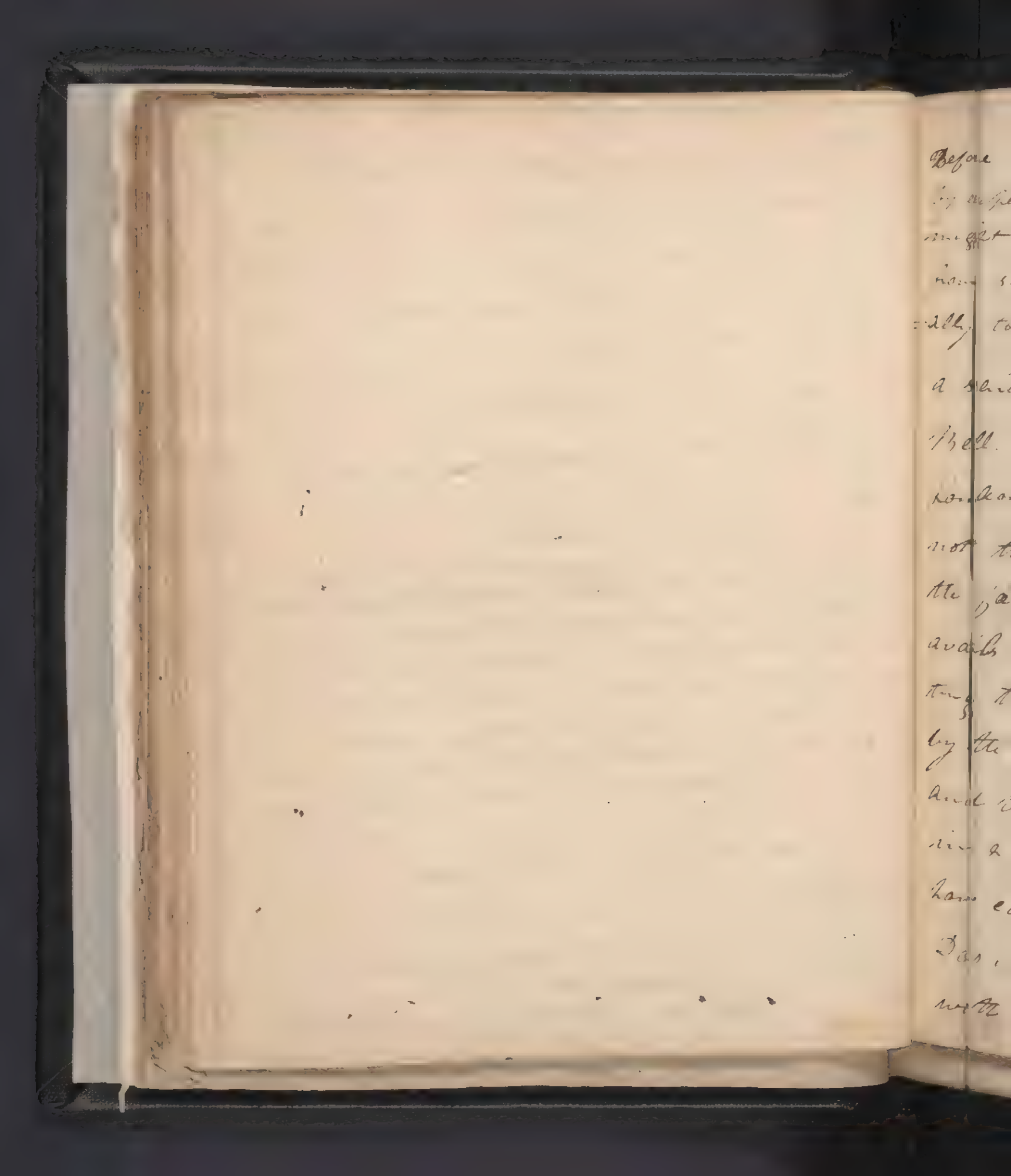
* The following case will show how ~~confidently the foetus can~~ very doubtful it is that a connection exists between the mother & foetus. Mr Shelley & Myself were this winter engaged in an obstetric case; It was a foot ~~[illegible]~~ presentation, the child was destitute of respiration for upwards of an hour after delivery, inflation of the lungs was practised frequently during the first 15 minutes, when the placenta being delivered, that with the child was removed to a tub of warm water in 45 min or more the phenomena of life began to appear — The chord exhibited the usual [illegible] appearance of venous & arterial blood at the place of its division —

The difference in the ~~nature~~ of fetal from the adult blood is shown by the difference in the pulsation of the arteries of the foetus [illegible] its mother is admitted by all. —

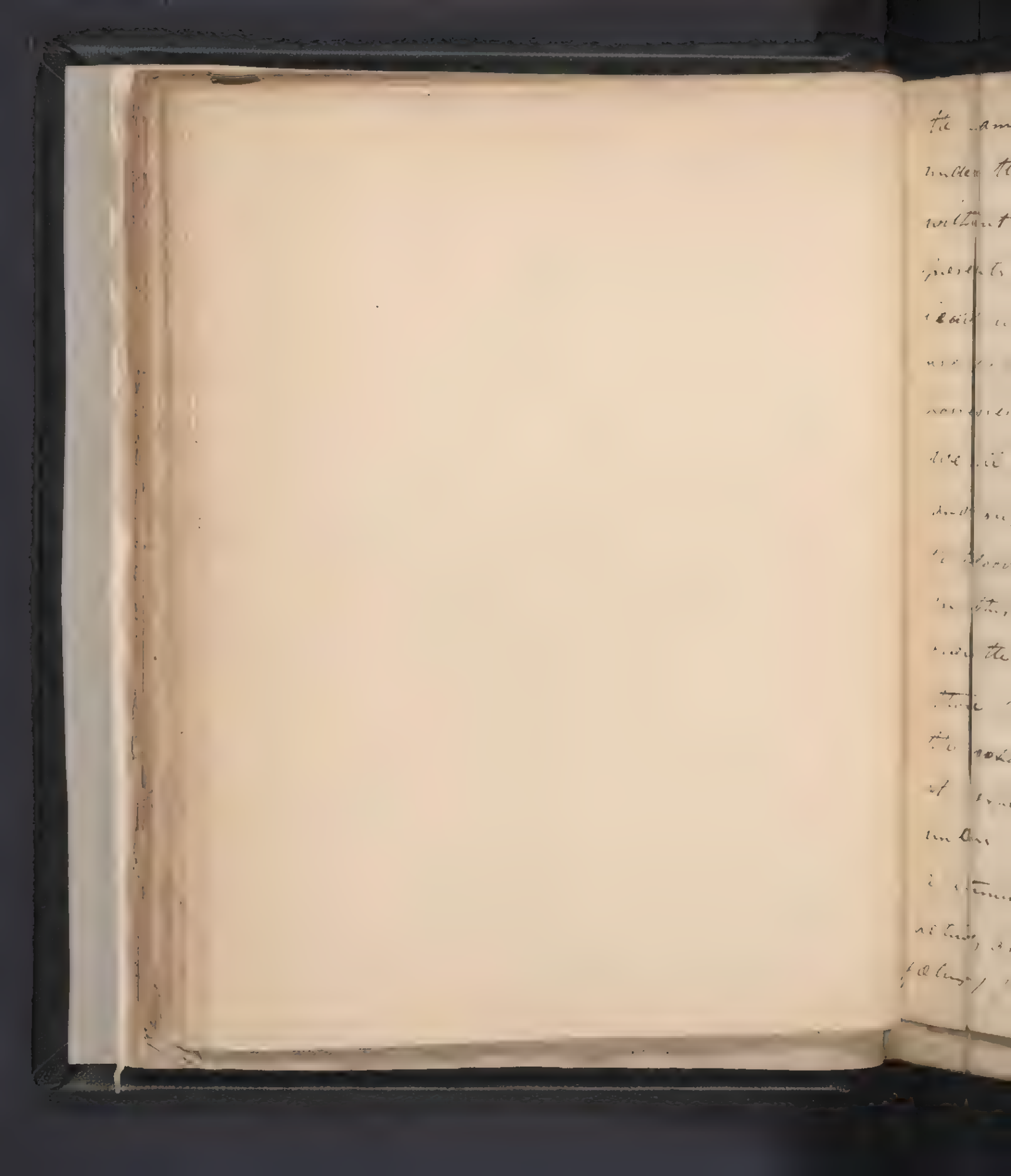


Before this was found to be the true state of things, in experiment, the system we are now considering might have had some degree of plausibility from such a connection being supposed actually to exist. But there is a fact being known a serious difficulty presented itself to J. Bell the celebrated Anatomist & Surgeon of London. He found that oxygen could not through the medium of the blood enter the foetal system. — To remove this, he avails himself of a petitio principii, asserting that there is a something secreted by the Uterus which enters the placenta and brings along with it the oxygen in a concrete form. I would now ask how can oxygen acquire this form? Does it, in the Uterine circulation, meet with parts, which are destitute of caloric

to which it yields that which it is supposed to possess, & thus become concrete ? I do not suppose the oxygen enters the uterus in a gaseous form but only by its combination with the iron of the blood, produced by previous union with the Phosphorus of meat, nuts in the blood forming with it (as said) a salt — in what chemical process can we suppose it to wrench loose from matter with which it affinity has so close connection at ~~once~~, to assume a gaseous form ; combine with a portion of the uterus which perhaps does not exist/, then leave that and finally enter the placenta, & thus accomodated enter the circulating system of the child. —

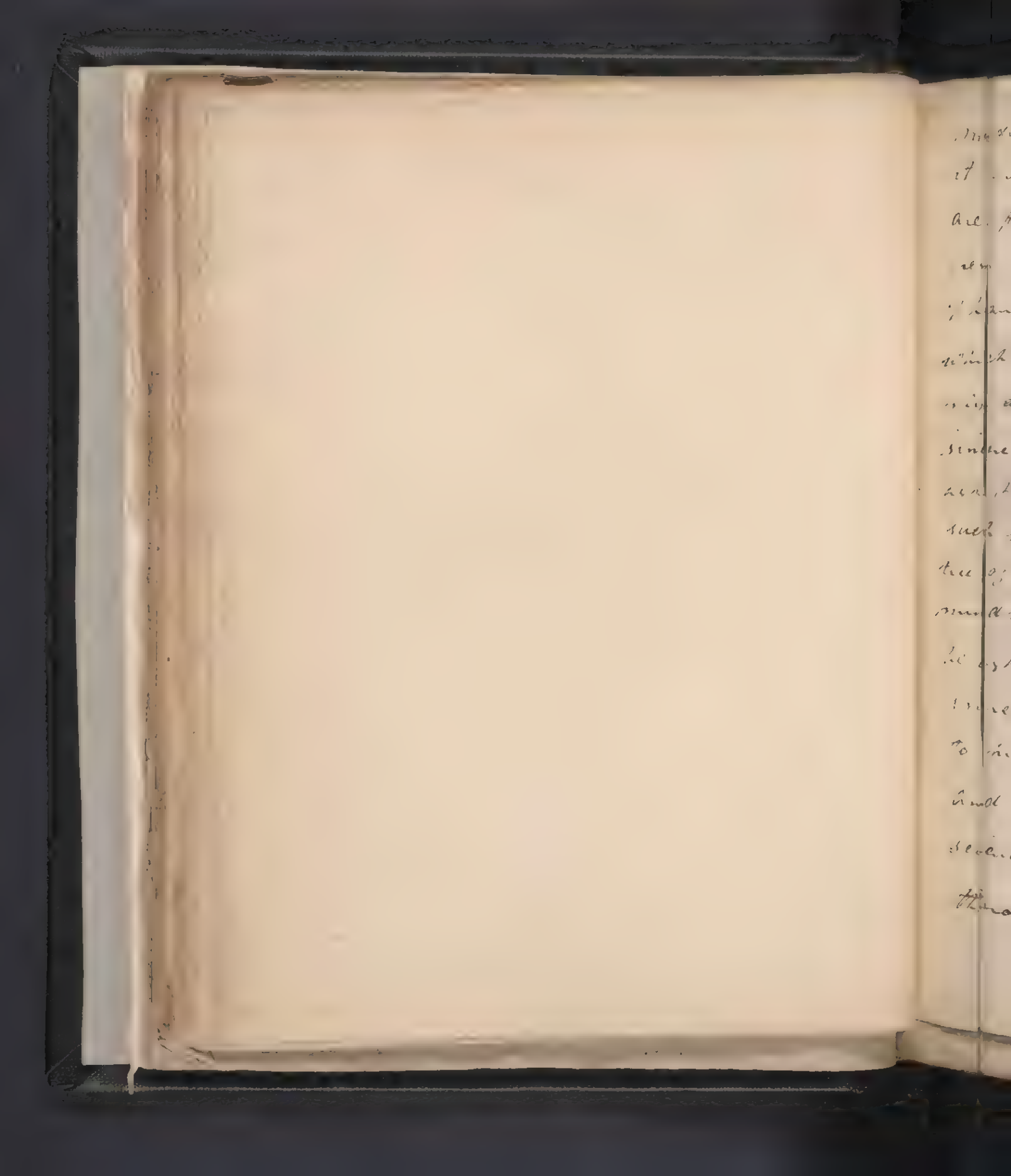
in the uterus [illegible] in a mucous or [illegible] state. [illegible] what means can oxygen [illegible] at the [illegible] of the [illegible] and [illegible] will [illegible] will [illegible] [illegible] [illegible] the [illegible] [illegible] [illegible] venous [illegible] of the [illegible] [illegible] But [illegible] while passing through the placenta? [illegible] state of the circulation in the uterus? The venous plethora exists. How then can we account for that remarkable portion of oxygen sufficient to the oxygenation of its own & the foetus's blood? And if it be admitted that contiguity of parts will account for the oxygenation of the blood where is the necessity for the bloods circulation & where in short is the necessity for respiration? —

That oxygen produces some changes in the blood [illegible]. [illegible] of ve-
nous blood to a fine florid color, but it [illegible] an animal substance, long deprived of the oxy-
[illegible] life, without it [illegible], on [illegible] from [illegible]. [illegible] principle.
[illegible] however [illegible] their color while under the [illegible] influence, it likewise has its ef-
fects on [illegible] matter. [illegible], [illegible] acts only as circumstances favor-
able to such action are present. [illegible] we can [illegible] the [illegible] demands of the system for air possessing oxygen [illegible] respi-
ration, and without any known medium for the passage of oxygen into its system, the [illegible] [illegible] in [illegible] of [illegible].



the same colour with that which is com[illegible]
under the influence of oxygenated air. The fact
without any communication with oxygen the fœtus
presents us with a circumstance which may
lead us to suppose (if oxygen have the effects
ascribed to it,) that the [illegible] (the fœtus) [illegible]
possesses a larger portion of oxygen than the adult.
We all know that the venous blood from the head
and superior extremities [illegible] in the heart
mixes intimately with
the blood received from the umbilical vein?
In this state the whole mass is circulated
over the whole system, the quantity of blood from
those parts is admitted to be large; but
the whole mass appears as highly arterial as
it respects color as that of the adult. Now
unless it be extremely pure it must act as
a stimulus [illegible] a foreign [illegible], this stimulus
acting on the accumulated excitability of the
fœtus (as such is [illegible] to be the case)

a degree of excitement the effect of stimulus acting on excitability, must follow constantly threatening [illegible] or even disorganization. — But if the portion of oxygen which the foetus receives is intended to remedy the effects which must follow from the [illegible] venous [illegible] blood, the [illegible] of [illegible] cannot take [illegible]. But I presume from the view given of the foetus as it respects the influence of oxygen on it, that neither of these theories will be contended for. I have now concluded my remarks on Animal Life. I have not [illegible] at the self originated power of some, nor the intelligent perceptive principle of others. I have only expressed the difficulties which present themselves when considering it as an effect. [illegible] professors of that theory, as men claim the respect, and admiration of the world, for they must be viewed the benefactors of mankind. The science of



Medicine has gained from them a certainty of which it was long destitute of, and its imperfections are fast fading away. Here would I now express my sincere gratitude, for the advantages I have enjoyed at this school. Advantages, which, the best talents, of the best men can only afford, I leave them with regret the most sincere. The mind loves to linger where it can drink & be satisfied. Yes richly satisfied with from such sources of intellectual bounty. In the practice of my profession, every cure will bring to mind the sources of my instruction. Should I be asked by any one on my return home, where is the best source of medical instruction. I shall point to him this rival of Europes best schools. And tell him there is a source of wisdom and science where medical ambition can be thoroughly satisfied. ——

Conception

Hardy N Irving

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